comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each of the plural samples into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (282) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

analyzing means for identifying, for each said flow channel (280), a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating

surface (251-254), and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the groove pitch identified for each said flow channel (280).

62. An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 44, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each sample into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (280) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction

grating surface (251-254) and received by said light receiving means (213);

analyzing means for identifying, for each said flow channel (280) and for each of the reaction area and the non-reaction area, a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the groove pitches of the reaction area and the non-reaction area identified for each said flow channel (280).

63. An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 39 or 40, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface (201a) being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means

(211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface (201a); and

analyzing means (214) for selecting a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (251-254).

64. An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 41, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

correcting means (214) for correcting the intensity of the reflected light due to each said diffraction grating surface (251-254) with consideration given to the intensity of the reflected light due to the respective non-diffraction surface (251x-254x);

determining means (214) for determining the variation between the intensity, corrected by said correcting means (214), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface;

analyzing means (214) for selecting a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (251-254).

65. An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 42, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light

receiving means (213);

determining means (214) for determining, for each of the reaction area and the non-reaction area, the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

analyzing means (214) for selecting, for each of the reaction area and the non-reaction area, a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area.

66. An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 43, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a

plurality of different samples to said plural flow channels (280), respectively, and for introducing each of the plural samples into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (280) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample does not flow through each said flow channel (280); and

analyzing means for selecting, for each said flow channel (280), a diffraction grating surface (251-254) whose variation, determined by said determining means

(214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280) based on the variation of the reflected-light intensity of the diffraction grating surface (251-254) selected for each said flow channel (280).

67. An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 44, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each of the plural samples into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (280) by said sample introducing means (282);

light receiving means (213) for receiving the

light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining, for each of the reaction area and the non-reaction area, the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample does not flow through each said flow channel (213); and

analyzing means (214) for selecting, for each said flow channel (280) and for each of the reaction area and the non-reaction area, a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area for each said flow channel (280).

68. An apparatus as defined in one of claims 58-67, wherein it further comprises sample separating means (292) for separating the sample by physical and/or chemical action prior to introducing the sample to the surface plasmon resonance sensor chip.

69. An apparatus as defined in claim 68, wherein said sample separating means (292) is operable to separate the sample by a separation technique using at least one of liquid chromatography, HPLC (high performance liquid chromatography), capillary electrophoresis, microchip electrophoresis, flow injection, and microchannel.

70. An apparatus as defined in one of claims 58-69, wherein

the target species is a light-emitting substance,

said light receiving means (213) is operable to detect the light emitted from the light-emitting substance that is bound to the binding substance, and

said analyzing means (214) is operable to quantitatively and/or qualitatively analyze the sample with consideration given to the detection result of the light emission by said light receiving means (213).

71. A surface plasmon resonance sensor chip comprising:

a metal layer (23) along whose surface a surface plasmon wave can be induced by light irradiation; and

a diffraction grating curved surface (25) disposed in the vicinity of said metal layer (23), said diffraction grating curved surface (25) having a diffraction grating with a uniform groove orientation and a uniform groove pitch so as to generate an evanescent wave upon light irradiation;

wherein said diffraction grating curved surface (25) has a curved surface form in a convex shape whose light-irradiated side bulges out, and is disposed so as to be perpendicular to a specific plane (S1), which is perpendicular to a predetermined reference plane (S0), and the diffraction grating is formed in such a manner that the groove orientation is perpendicular to the specific plane (S1).

72. A surface plasmon resonance sensor chip comprising:

a metal layer (233) and a diffraction grating (235) formed in the vicinity of a sensor surface, which comes in contact with a sample; and

a resonance area (238a-238d), formed on the

sensor surface (231a), for causing a resonance phenomenon of a surface plasmon wave, which is induced along the surface of said metal layer (233), and an evanescent wave, which is generated by the action of the diffraction grating, upon light irradiation;

wherein said resonance area (238a-238d) has a plurality of continuous areas (238a-238d) discretely formed on the sensor surface (231a), and at least one continuous area (238a-238d) among the plural continuous areas (238a-238d) has a diffraction grating whose at least one of the groove pitch and the groove orientation is different from those of the remaining continuous areas (238a-238d).

73. A surface plasmon resonance sensor chip comprising:

a metal layer (233) and a diffraction grating (235) formed in the vicinity of a sensor surface, which comes in contact with a sample; and

a resonance area , formed on the sensor surface, for causing a resonance phenomenon of a surface plasmon wave, which is induced along the surface of said metal layer (233), and an evanescent wave, which is generated by the action of the diffraction grating, upon light irradiation;

wherein said resonance area is formed

continuously on the sensor surface, and the groove orientations of the diffraction grating (225) are uniform while the groove pitches of the diffraction grating (225) have a continuous or discontinuous distribution.